Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Telecommunications Relay Services, and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities	)	CC Docket No. 98-67

COMMENTS OF
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I. Introduction/Overview

Ultratec, Inc. hereby submits these comments in response to the Federal Communication Commission's Notice of Proposed Rulemaking (NPRM) CC Docket No. 98-67. As a technology provider and a leading manufacturer of text telephones (TTYs), Ultratec takes great interest in this proceeding since the TRS network provides a critical communications link for our consumer base as they go about utilizing the telephone network. Ultratec believes this proceeding will benefit from our sharing some of the technological solutions we have developed which could bring the TRS network to a new and higher level of performance.

Ultratec takes special note of the strong expression for functionally equivalent access by all the major comrnenters in NO1 comments submitted on March 17, 1997, and April 2 1, 1997. Ultratec believes the Commission's NPRM should be expanded to further address the expressed concerns of consumers and administrators regarding the implementation of technological advancements to ensure that the telecommunications access afforded to individuals with hearing loss and speech impairments is 'functionally equivalent' to voice calls.

Ultratec applauds the FCC's issuance of an NPRM with the intent of providing final rules that include needed changes in order to make certain this important service is facilitating communications for all those who rely on the TRS system as envisioned. TRS serves as a vital tool necessary to ensure those who are deaf, hard of hearing, late-deafened, deaf-blind and speech impaired telecommunication access for purposes of business, safety, social actions and optimal employability. In exploring whether the current provisions are sufficient, one needs to evaluate whether the existing system as currently regulated and operating serves all the various segments of this population including the hearing, non-text based users that complete the vital link established in these communications in a cost effective, functionally equivalent manner.

A. Overview of the NPRM Purpose and TRS Provisions

In the NO1 the FCC stated the purpose of this review of the 199 1 TRS Order was, " to ensure...an effective statutory scheme that provides the greatest degree of access to telecommunications services by individuals with hearing and speech disabilities." As noted in the FCC NPRM, Congress clearly intended for our TRS network to keep up with emerging telecommunications provisions to assure

continued access for all segments of the served population. As stated in the House II Report at 130:

"This legislation is not intended to discourage innovation regarding telecommunications services to individuals with hearing and speech impairments. The hearing and speech-impaired communities should be allowed to benefit from advancing technology. As such, the provisions of the Section **do not seek to entrench current technology,** [emphasis added] but rather to allow for new, more efficient and more advanced technology."

Ultratec fully endorses full implementation of Congress' stated intent and wishes to see the Commission help bring about the use of innovative new technologies which will help our nation's TRS network stay in line with current technological possibilities. In fact, in the Commission's NPRM, VRI and STS are tentatively proposed as "improved services" that "[go] beyond the current TTY-to-speech and speech-to-TTY model," thus extend TRS provisions to those not already optimally served by the current TRS system. Covering these extensions of service to ASL users and speech impaired users with reimbursement from the TRS Fund seems appropriate. We endorse this proposal, and ask that the Commission entertain expanding this list of "improved" services to include other technologies that allow TRS to reach under served segments such as for those that are late-

deafened and those who require real time transmission to compete optimally in the employment arena. Utilization of voice recognition applications such as Fastran (Fast Transcription) would be a most appropriate example of a service enhancement that could reach this untapped pool and would benefit from cost recovery mechanisms to hasten implementation. Incorporation of voice recognition technology applications specially designed for relay such as Fastran will allow TRS to serve a group of individuals currently not sufficiently served by existing TRS as shown by comments received in the NO1 proceeding. As several commenters asserted, the costs for "improved" TRS should be recoverable from the TRS fund, regardless of whether such improved services are required or are provided voluntarily, if they expand the relay to encompass a new segment of the intended population, yet to be properly served by the current TRS system. We believe it is appropriate to consider Fastran application for relay as one of the "improved" services that can qualify for cost recovery, because we believe initial cost to implement this innovative solution will be a potential obstacle based on the general practice of 'lowest bid' wins currently in effect across the nation.

B. Cost Recovery for Under Served Segments of the Population

Our nation's relay service opened the doors for 24 hour, 7 days a week telecommunications access nationwide. We commend those who have implemented TRS as widely as seen to date, since on occasion legislative initiatives fall short of proper implementation and enforcement. In fact, the provision of TRS has probably been one of the most widely implemented telecommunications-related provisions of this legislative era, aside from implementation of 911 direct TTY access. However, in this proceeding the Commission should take care to make certain that the new TRS Order truly encompasses and serves the *entire* community of those who are deaf, hard of hearing, late-deafened, speech impaired. As the FCC has well noted, those who have speech impairments and those who rely most heavily on ASL represent an untapped, under served segment of the population TRS is intended to serve. We believe another untapped, under served segment lies with those that are late-deafened as well as deaf, and hard of hearing professionals.

This segment of our population needs, and has requested real-time transmission to remain competitively employed and interested in making use of the TRS for all their transactions over the phone. The Association of Late

Deafened Adults stated most emphatically in their NO1 comments that, "real-time transmission is fundamental to 'functional equivalence.' Its absence to date has generated widespread animosity for today's model of service, and hostility and impatience on the part of the voice-user towards people who are deaf, hard of hearing, or speech impaired" (ALDA NO1 Comments at 5). Those that grew up using the phone in the traditional manner often find TRS does not meet their desired communication level, thus they avoid using the service and sometimes they avoid using the telephone on their own all together.

C. Title IV Intent to Help Level the Employment Playing Field

If the ADA was intended to 'level the playing field' in the area of employment, Title IV of the ADA needs to serve as a mechanism to assure real-time communications to those who need this telecommunication access. If a prospective employer asks a deaf applicant how they will perform the essential functions of the job, the deaf candidate is likely to indicate they will rely on relay. If the prospective employer's experience with relay is not one that they want their customers and clients to experience this becomes troublesome. In fact, this author has heard from numerous deaf TRS users stating that their superiors have received

calls from hearing clients and customers asking that the deaf employee not be allowed to call them through relay as they find it a cumbersome and undesirable experience. As discriminatory as this may be, this clearly indicates that the current system is still not optimal or acceptable to some in the employment arena. This becomes problematic if Title IV is intended to resolve this communication obstacle for gainful employment.

Also, if one polls text-based, employed professionals as to whether they are confident and comfortable relying on relay for professional, business calls we believe you will find many will tell you TRS as currently implemented at limited text transmission speeds, and often limited typing speeds does not meet their needs. In fact, many deaf professionals (including some employed by TRS providers) will tell you they use interpreters to facilitate their calls to control how they come across over the phone as professionals. For those who do not have the luxury to compensate in this manner they either take a business risk, ask a co-worker to assist them or make the call for them, or scramble to find another avenue of communicating such as via e-mail or fax. Fortunately these avenues exist, however, they cannot always replace the back and forth communication that is available in a live telephone call, and the need for such individuals to be independent of reliance on others.

If you also poll the hearing non-TTY user regarding their experience of Relay, although they are grateful for some means of communicating, they too will tell you it is not the experience they desire or expect given all of the potential technology that could allow TRS to be a much "improved" service. The National State Relay Administrators (NASRA) NO1 comments state that "technology is desperately needed to make TRS more 'user friendly' and efficient for voice TRS callers. The FCC should encourage the industry to develop technology that would improve the 'flow' of relay calls to be more similar to that of a voice call" (NASRA NO1 comments at 12). Ultratec points out these short comings of our current TRS system to illustrate the need for technological solutions to address these weaknesses.

D. Care in Avoiding Anti-Competitive/ Regulatory Practices

Ultratec believes the Commission should not enter into anti-competitive or harmful regulatory practices that would target specific technologies or technology developers in ways that would injure their incentive to innovate and supply better, more cost effective, more time efficient methods of providing TRS services. Ultratec concurs with Sprint's NO1 statement that a technology developer "may be

less eager to develop a new technology if it knows that as soon as it offers the new technology in the marketplace, the Commission will require . ..competitors to also offer that technology and as a result limit the carrier's ability to reap the full benefit of its innovation in the marketplace" (Sprint NO1 Comments at 4). Ultratec is not asking the FCC to mandate any specific technologies, however, we are asking that such technologies provided they have real value to the TRS user, be recognized as "improved" services that better serve the intended population and thus are eligible for coverage of TRS Fund cost recovery when implemented.

We wish to note, many of the most important technologies used by TRS have been developed and patented including the most basic technology of all, Baudot or "Baudot/Weitbrecht" as it has historically been known. This proprietary technology, which launched the TTY network in 1963 and upon which the TTY network is still based, was invented by Robert H. Weitbrecht who patented this technology and received royalties for the use of it until he died in 1983. VCO and HCO are also patented inventions which were developed in the mid 1980's and were first demonstrated by Ultratec at Gallaudet University in 1988. Auto Code which automatically detects ASCII, Baudot and other codes and automatically switches the TTY appropriately, Auto I.D. which automatically sends TTY signals during silent periods so that hearing people will know a TTY is on the line, and

Enhanced TTY Protocol or "Turbo Code@" are all patented inventions which have served to significantly enhance the use and accessibility of the TTY and TRS network. Many large TRS providers have also been patenting their innovations and utilizing their proprietary technologies. Should the Commission impose regulations which would target such technologies for competition or bring unfair pressure upon the technology developers, forcing them to give up the rights to their inventions, there would be little incentive to invest further resources in improving the network.

II. Need for Technological Advances

A. Industry/Consumer/RBOC/State Administrator Support

Ultratec strongly endorses the NO1 comments that support the need for technological advances and innovativeness. We feel it is very important that services do not become stagnant and ineffective over time, and that new and existing technology is implemented. Supporting this view, the FCC has sought to assure that its administration of the TRS program will not inadvertently deter or inhibit the deployment of new and advanced technologies that may provide

additional benefits to TRS users (See NO1 at 8 -quoting legislative history, and AT&T at 2-3). In addition, Ameritech, Bell Atlantic, NYNEX, Bell South and Pacific Telesis generally encourage the deployment and development of improved forms of TRS where technically and economically feasible and where sufficient demand exists in the NO1 comments. Ultratec supports GTE's NO1 statement that the FCC should not impair the development of technology (GTE NO1 comments at 6-7). Ultratec also wishes to endorse Pacific Telesis' NO1 comments and the Commission's goal of ensuring that technological improvements are made available to persons with disabilities to enable them to fully participate in telecommunication services (PacTel NO1 Comments at 3).

B. Cost Effectiveness/Cost Recovery Mechanisms

Ultratec believes an effective cost recovery mechanism is important. Without it, contractual agreements often lock themselves into current technologies for 3 to 5 years. Some states are wisely adding clauses allowing for emerging technologies that come about during their contract's life span. As important, we believe that relay services should be operated in a cost effective manner with quality service which benefits the consumer, the Relay Administration, and the

rate/tax payers who must foot the bill. There presently exist new technologies which are readily available and can provide tremendous cost benefits, yet are not being fully utilized nationwide in part due to lack of cost recovery mechanisms.

The Oregon PUC NO1 comments suggested rules should be written to provide incentives to resolve issues such as cost. Ultratec agrees with Oregon and others and encourages the FCC to carefully consider the option to allow cost recovery issues when associated with "improved' TRS provisions.

The Commission "agreed with commenters" in paragraph 58 of the NPRM, "that new technologies, such as enhanced protocols and enhanced computer software, could greatly increase TRS transmission times and, consequently, CA typing speeds." (FCC NPRM at paragraph 58). The Cornmission seeks comment on the extent to which such technologies have been adopted by TRS users and TRS providers.

A number of states have implemented use of enhanced protocols since the NO1 comment period. To our knowledge, the states that currently offer an enhanced protocol are New Jersey, District of Columbia, Maine, Georgia, Tennessee, California, and Wisconsin. More states are expected to implement use of an enhanced protocol this year. We hope the states that have implemented this enhancement or those who intend to implement use of an enhanced protocol will

share this in more detail with you. Several states have contracts expiring in the next year, thus we anticipate others will consider securing this communication protocol amongst other new provisions.

At this time, Fastran is very new technology that has yet to be implemented, but offers tremendous potential for higher transcription speeds amongst the CA labor pool. With Fastran, a CA simply re-voices the hearing party's comments, thus the typing speed issue becomes a 'non-issue' as voice transcription would transmit the spoken text at speeds close to spoken speech.

III. Recognition of Need for Improved and Updated Standards

A. NO1 Commenters' Support

Ultratec supports NO1 commenters that expressed the need for improved and updated standards for the purpose of achieving a quality program that brings about functional equivalence. NASRA acknowledged that current mandatory minimum quality standards are not strong enough (NASRA NO1 comments at l-2). The State of Maryland also acknowledged the need to increase minimum standards. Raising the minimum standards contained in Title IV of the ADA would allow a

greater degree of parity in the ease of access and usage between TRS calls and standard voice calls (MD NO1 comments at 4). All consumers' comments took strong positions that current standards are inadequate in that they do not reflect normal, and 'functionally equivalent' telephone conversations between two people who hear and speak. We believe since functional equivalence was the intent of Congress, some fine tuning should be done to bring the mandatory minimum standards up to a more appropriate functional level. However, we feel that care should be taken to balance regulatory requirements with flexibility for innovation, thus we concur with Ameritech in their recommendation that the Commission continue to prescribe minimum quality requirements that are designed to ensure equivalent and high quality services from the end users' perspective across all centers (Ameritech at 5-6).

B. FCC 1991 Statement of Intent to Improve Standards as Needed

In the FCC Report and Order released July 26, 199 l, the Commission stated, "we intend to monitor closely, through the complaint process and otherwise, the actual quality of relay services. If experience shows that imposition of additional minimum standards is required, we will not hesitate to prescribe such standards."

IV. Functional Equivalence

A. Intent of Congress for Title IV of the ADA

The NAD noted in their initial NO1 comments Congress' unequivocal mandate that regulations implementing Title IV "not discourage or impair development of improved technology." 47 U.S.C. 225(d)(2). Rather than "entrench current technology," Title IV was designed "to allow for new, more efficient and more advanced technology." H.R.Rep. No. 101-485 (II), 101 st Cong., 2d Sess. 130 (1990)

Ultratec agrees with numerous NO1 comments that acknowledge relay services "have not kept up with technological advances in the rest of the telecommunications industry" (NVRC NO1 comments at 6). We concur with SHHH's point stating that, "there needs to be more of a commitment on the part of relay providers to invest in improvements in technology to bring some sophistication to the relay" (SHHH NO1 comments at 4-6). NVRC wisely points out that, "current standards do not address the effectiveness and quality of TRS" which would result in functional equivalency (NVRC NO1 comments at 6).

B. Need to Keep Pace with Available Means

Ultratec as well as "NASRA believes that technology is desperately needed to make TRS more user friendly and efficient for voice TRS callers. The FCC should encourage the industry to develop technology that would improve the flow of relay calls to be more similar to that of a voice call" (NASRA NO1 comments at 12).

NAD raised the need for "comprehensive monitoring of relay services nationwide, combined with coordinated efforts by consumers, industry, and government to ensure those services keep abreast of current technologies...to ensure a level of relay service that is functionally equivalent to telecommunication services enjoyed by the general public" (NAD NO1 comments at 17- 19). Thus, we are puzzled as to why the Commission largely ignored the expressed concerns of major commenters for implementation of new technologies that would bring about functionally equivalent, real-time communications. Functional equivalence needs to go beyond the 'dial tone' via better answer times, to truly make an impact on the overall relay experience.

V. Operational, Technical, and Functional Standards

A. Mandatory Minimum Standards

1. CA Competency Skills -Typing Capabilities - Sec. 64.604 (a) (1)

Nearly all of the consumers of relay, as well as the National State Relay Administrators, commented in their NO1 submissions on the need for a mandated minimum standard for improved Communication Assistant typing capabilities (NOI Comments of SHHH at 3, AGBell at 3, MATP at 3, CAD at 2, ALDA at 5, NAD at 6, DC/VA at 3, Nelson at 5, NASRA at 4-5, Coalition at 2). ALDA pointed out that "minimum standards are painfully inadequate and there is no incentive for relay providers to exceed them" provided the current structure lacking consumer-driven competitiveness (ALDA NO1 at 4-5). ALDA further pointed out the current minimal standards do not define and address the operational, functional and technical standards that are fundamental to a functionally equivalent service (ALDA NOI at 7). In the 199 1 proceeding, the FCC modified the proposed rules to require TRS providers themselves to be responsible.. ." rather than articulate a low threshold of expectations" (FCC Report

and Order, July 26, 199 1). As pointed out by the Coalition of Protection and Advocacy Systems "the CA's typing speed must be increased" (Coalition NO1 Comments at 2).

TRS providers acknowledged it would be difficult to find CA's with this level of ability in the labor pool. Given the number of commenters (most importantly the actual users of TRS) that strongly recommended an improvement in the minimum speed of the overall conversation, it would seem merited that the FCC consider a bare-bone minimum of no less than 60 words per minute (wpm) to at least be within the optimal capabilities of the Baudot code at 45.5 baud. Many commenters suggested typing speeds of 100 wpm. Perhaps the overall concern can be addressed with voice recognition technologies such as Fastran instead. Higher transcription speeds are vital to those who wish to take advantage of the true benefits of enhanced protocols such as Turbo Code or ASCII. Ultratec encourages the FCC to set minimum requirements for the speed of transcription (either via CA typing speed or voice recognition use with the CA re-voicing) to reflect the capabilities of the consumer's current equipment.

VI. New Technologies - Sec. 64.604 (b) (5)

The current regulations state, "No regulation set forth in this subpart is intended to discourage or impair the development of improved technology that fosters the availability of telecommunications to persons with disabilities."

Ultratec supports the numerous NO1 commenters who expressed the importance of utilizing new technologies especially new technologies which are already available. Louisiana Relay Administrative Board encouraged this view stating, "Technology affords us many opportunities to improve the quality of relay service. Enhanced protocols such as Turbo Code...enable more efficient use of a CA's time and a better quality of service to the end user" (LA Relay Adm Bd NO1 comments at 4). Other commenters also noted, "Typing speeds can be enhanced, especially with the introduction of the new TTY technologies such as Turbo Code...This would reduce the length of calls, thereby reducing the cost of services" (CA PUC NO1 comments at 14). NVRC stated, "TRS providers should be required to regularly upgrade their equipment to keep up with TRS users. This would include the ability to communicate through Turbo Code..." and keep up with the pace of technological solutions to unnecessarily slow transmissions, once they are readily available (NVRC NO1 comments at 15).

The remainder of our comments reiterate previously shared information provided in our reply comments for the Notice of Inquiry. We are entering the information here so that it is contained within this proceeding as well.

A. Enhanced TTY Protocol (Turbo Code®)

Enhanced TTY Protocol, trade named Turbo Code®, was invented by Ultratec specifically to address the telecommunications needs of deaf, hard of hearing, and speech impaired individuals and to overcome the shortcomings of traditional Baudot/Weitbrecht and ASCII codes as used in the text telephone environment. Over the past eight years, Turbo Code has been continuously improved, modified, and adapted for a variety of applications in text and combined voice/text communications. Several NO1 commenters have made reference to the speed of Turbo Code and other technical specifications which Ultratec wishes to clarify for the general benefit of this proceeding.

1. Speed of Turbo Code

The original Turbo Code operated at a maximum speed of approximately 105 words per minute (approximate because of the unique timing of each character transmitted, thus different words actually transmit at slightly different speeds). This is almost twice the speed of Baudot. This speed was chosen because it is faster than the sustained rate that most people can type (and close to the average sustained rate that most people talk), yet remains slow enough to be easily readable on a traditional 20 character TTY display, even when messages are being sent from memory by another TTY or by TRS at maximum speed.

More recent versions of Turbo Code are capable of speeds substantially in excess of 105 wpm to enable Turbo Code to keep pace with the anticipated speed of real time relay transcription and to speed up data transfers between the TRS equipment and the user's TTY when automating calls. Enhanced versions of Turbo Code also have the capability of slowing down for users whose reading abilities require slower speeds. The receiving user will be able to control the rate of transmission from the transmitting party so that reception is at a pace comfortable to the receiving user.

2. Turbo Code Character Set

Turbo Code is based on a seven bit table which allows for 128 characters. This compares with only 62 available characters for Baudot and is equivalent to the character set for ASCII.

3. Compatibility with Baudot and ASCII based TTYs

Turbo Code is completely compatible with older TTYs which do not have Turbo Code capability. Turbo Code automatically searches to see if the other TTY is Turbo Code capable by periodically sending a very short burst called a "synchronization signal". If the other TTY sends back an appropriate signal, Turbo Code is linked. If not, the Turbo Code unit reverts to Baudot. This searching is completely transparent to the user and is totally automatic.

In the event that the Turbo Code equipped TTY also has ASCII code, ASCII is included in the Auto Code search sequence.

B. Advantages of Enhanced TTY Protocol with Interrupt Capabilities

Ultratec agrees with the many NO1 commenters who have recognized that Turbo Code can be of significant value in the relay environment. Consumer's commented, "Enhanced protocols would be of great value to traditional users of TRS. ASCII is not always a reliable communication mode. Newer technologies exist which improves Baudot transmission time yet retains the flexibility of call transfer, hold, and other functions which can be done via a voice transmission. Interruption functionality allows for a more natural communication flow. The FCC should encourage the deployment of this technology" (WI TRS ADV at 4-5). SHHH supported the deployment of "widespread awareness and availability of alternative protocols such as the interrupt capabilities which can cut down on the length of the call by as much as 30%" (SHHH NO1 comments at 5). VA/DC Association of the Deaf, NAD, MATP, and ALDA all commented that newer TTY protocols, such as Turbo Code, would more closely approximate the speed of talking, coupled with higher typing speed requirements (NOI comments of DC/VA at 3, NAD at 13, MATP at 3, ALDA at 3, WI TRS ADV at 5). However, the Massachusetts Assistive Technology Partnership noted, "Turbo Code is readily achievable and available today. It provides faster transmission of the text and does

not have the 60 wpm transmission limit that Baudot has." MATP also noted, "There is no incentive for relay providers to use Turbo Code, just as there is no incentive for providers to encourage faster typing speeds by operators because they are reimbursed at per-minute rates, and there is no incentive for them to make the calls any shorter" (MATP NO1 comments at 3).

1. Advantages to the Consumer and the Relay Administration

The National Association of State Relay Administrators has acknowledged the potential cost savings of providing an enhanced protocol in their comments. "This technology may also reduce the overall minutes of use for relay services...The speed of transmission should reduce overall minutes of use including long distance charges to the TTY customer" (NASRA NO1 Comments at 10).

Ultratec has conducted extensive testing of Turbo Code as used in relay calls and has found that the faster transmission speed of Turbo Code alone can save from 10% to as much as 45% of the time necessary to complete the same relay call. At present, the actual average time saved tends to be in the 10% to 20% range, due primarily to the typing speeds of CAs.